

In the claims:

Please amend the claims as reflected in the following listing:

1-10 (Canceled)

11. (New) A reciprocating gas compressor operated by controlling its valve timing according to an extended cycle of 4, 6 or more strokes, wherein the first two strokes are sequential induction and compression strokes using a low pressure gas as working fluid and compressing it to a high pressure gas, and the remaining strokes are pairs of sequential filling and emptying strokes using more of the low pressure gas as heat transfer fluid for transferring heat from inside the gas compressor to outside the gas compressor.

12. (New) A reciprocating gas expander operated by controlling its valve timing according to an extended cycle of 4, 6 or more strokes, wherein the first two strokes are sequential expansion and exhaust strokes using a high pressure gas as working fluid to produce power by expansion, and the remaining strokes are pairs of sequential filling and emptying strokes using warm air or warmed expelled gas as heat transfer fluid for transferring heat from outside the expander to inside the gas expander.

13. (New) A reciprocating gas compressor as claimed in claim 11, operating as a single stage or multi-stage gas compressor, each stage comprising at least one cylinder having a variable volume defined by a reciprocating piston 120 which draws gas (working fluid) from the an upstream gas supply into the cylinder during the induction stroke and compresses the gas to a high pressure before the gas is released to a downstream high pressure gas reservoir 320 during the compression stroke, characterized in that an open matrix heat regenerator of high heat capacity is additionally provided occupying the clearance space in the cylinder, and the reciprocating gas compressor is operated according to an extended cycle comprising after the said induction and compression strokes, at least one pair of extra strokes each pair consisting of a filling stroke in which more gas (heat transfer fluid) from the upstream gas supply is drawn by the piston into the cylinder to fill the cylinder followed immediately by an emptying stroke in which the filled gas is expelled by the piston out of the cylinder back to the upstream gas supply, such that the filled heat transfer gas cools the heat regenerator and the inside walls of the cylinder and lowers the heat regenerator temperature close to the temperature of the filled gas during the extra strokes, before the extended cycle is repeated with the working fluid of fresh gas from the upstream gas supply inducted into the cylinder and compressed while being cooled by the heat regenerator during the next compression stroke.

14. (New) A reciprocating gas expander as claimed in claim 12, operating as a single stage or multi-stage gas expander, each stage comprising at least one cylinder having a variable volume defined by a reciprocating piston which produces work when a predetermined quantity of high pressure gas serving as working fluid is admitted into the cylinder and allowed to expand against the piston to produce power during the expansion stroke, and the expanded gas is subsequently expelled from the cylinder displaced by the piston during the

exhaust stroke, characterized in that an open matrix heat regenerator of high heat capacity is additionally provided occupying the clearance space in the cylinder, and the reciprocating gas expander is operated according to an extended cycle comprising after the said expansion and exhaust strokes, at least one pair of extra strokes each pair consisting of a filling stroke in which warm air or warmed expelled gas serving as heat transfer fluid is drawn by the piston into the cylinder to fill the cylinder followed immediately by an emptying stroke in which the filled gas is expelled by the piston out of the cylinder, such that the filled gas warms the heat regenerator and the inside walls of the cylinder and raises the heat regenerator temperature close to the temperature of the filled gas during the extra strokes, before the extended cycle is repeated with the working fluid of fresh high pressure gas admitted into the cylinder, warmed by the heat regenerator while expanding to produce power during the next expansion stroke.